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JUMO Ex-i Isolating Switch Amplifier

Brief description

JUMO Ex-i isolating switch amplifier ensures reliable, galvanic isolation and safe transfer of switch signals in a wide range of applications.

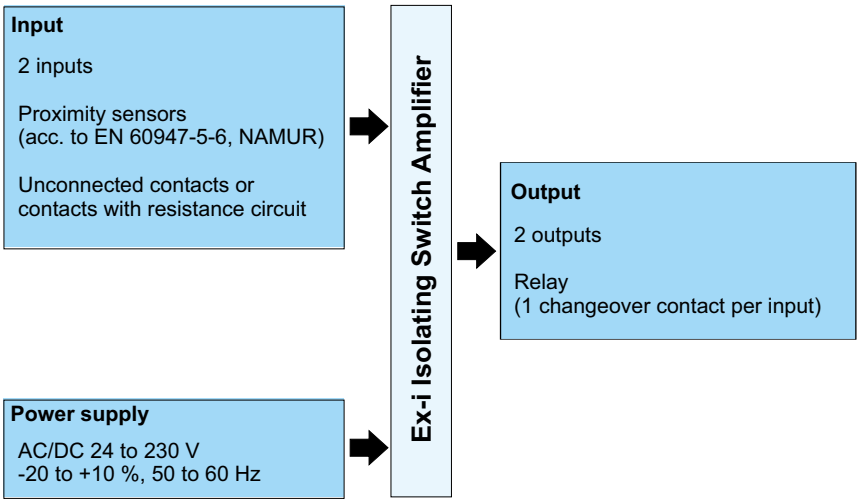
The intrinsically safe isolating switch amplifier is also suitable for use in Ex areas. It can be mounted in Ex zone 2 and used with a sensor in zone 0.

The JUMO Ex-i isolating switching amplifier is ideal for JUMO NESOS float switches with 2 switch contacts and also supports NAMUR proximity sensors. In addition, it features an extended ambient temperature range from -40 to +60 °C. The two-channel version eliminates the need for a second isolating switch amplifier so that it saves costs as well as space in the control cabinet.



Type 707540

Block diagram



Special features

- Intrinsically safe inputs for contacts or NAMUR proximity sensors
- 2 channels
- Output: 1 changeover relay (PDT) per channel
- Galvanic three-way isolation
- Wide-range power supply
- Line fault detection (line break, short circuit)
- Configuration with DIP switches
- Phase reversal option (switching output)
- Coded screw terminals for conductor cross sections from 0.2 to 2.5 mm²
- Extended ambient temperature range from -40 to +60 °C

Approvals and approval marks (see technical data)

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Technical data

Input

Input signals	Intrinsically safe, ⚠CAT II (250 V against ⏚)
NAMUR proximity sensors	in accordance with EN 60947-5-6
Switch contacts	Unconnected
Switch contacts	With resistance circuit
Number	2
Switching points	
Blocking	< 1.2 mA
Conducting	> 2.1 mA
Short-circuit current	~ 8 mA
Switching hysteresis	< 0.2 mA
Non-load voltage	~ 8 V DC
Line fault detection	
Break	0.05 mA < I_{IN} < 0.35 mA
Short-circuit	100 Ω < R_{Sensor} < 360 Ω

Output

Output data	Relay output, ⚠CAT II (250 V against ⏚)
Quantity	2
Contact type	1 PDT per channel
Maximum switching voltage	250 V AC (2 A, 60 Hz) / 120 V DC (0.2 A) / 30 V DC (2 A)
Maximum switching capacity	500 VA
Recommended minimum load	5 V / 10 mA
Mechanical service life	10^7 cycles
Switching frequency	≤ 20 Hz (load-dependent)

General data

Supply voltage range	24 to 230 V AC/DC (-20 to +10 %, 50 to 60 Hz)
Max. current consumption	≤ 42 mA (24 V DC), ≤ 80 mA (20 V AC), maximal ≤ 80 mA
Power dissipation	≤ 1.3 W
Power consumption	≤ 1.1 W
Step response	
N/O contact: ON/OFF	~ 6 ms
N/O contact: OFF/ON	~ 6 ms
N/C contact: ON/OFF	~ 4 ms
N/C contact: OFF/ON	~ 10 ms
Ambient temperature range	
Operation	-40 to +60 °C
Storage/transport	-40 to +80 °C
Humidity	10 to 95 %, non-condensing
Maximum altitude for use above sea level	≤ 2000 m
Degree of protection	IP20 in accordance with DIN EN 60529 (not assessed by UL)
Inflammability class in acc. with UL 94	V0 (housing)
Housing type	PA 6.6-FR gray (indoor use)
Electromagnetic compatibility	In accordance with DIN EN 61326-1
Interference emission	Class A – only for industrial use –
Noise immunity	Industrial requirement

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Connection

Conductor cross section rigid min.	0.2 mm^2
Conductor cross section rigid max.	2.5 mm^2
Conductor cross section flexible min.	0.2 mm^2
Conductor cross section flexible max.	2.5 mm^2
Conductor cross section AWG/kcmil min.	24
Conductor cross section AWG/kcmil max.	14
Stripping length	7 mm
Thread	M3
Connection type	Screw connection
Tightening torque min.	0.5 Nm
Tightening torque max.	0.6 Nm

Electrical isolation

Input/output	
Peak value acc. to EN 60079-11	375 V
Overvoltage category	III
Degree of pollution	2
Input/power supply	
Peak value acc. to EN 60079-11	375 V
Rated insulation voltage	300 V_{eff}
Test voltage	2.5 kV AC (50 Hz, 1 min.)
Overvoltage category	II
Degree of pollution	2
Safe isolation acc. to IEC/EN 61010-1	
Output 1/output 2/input, power supply	
Rated insulation voltage	300 V_{eff}
Test voltage	2.5 kV AC (50 Hz, 1 min.)
Overvoltage category	III
Degree of pollution	2
Safe isolation acc. to IEC/EN 61010-1	

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Safety data in accordance with ATEX and IECEx

Intrinsically safe sensor input					
Max. output voltage U_o	9.56 V				
Max. output current I_o	10.3 mA				
Max. output power P_o	25 mW				
Group	IIB/IIIC				
Max. external inductance L_o	1000 mH				
Max. external capacitance C_o	26 µF				
Additional text	Simple circuit				
Group	IIB/IIIC				
Max. external inductance L_o	100 mH	5 mH	1 mH	10 µH	
Max. external capacitance C_o	1 µF	1 µF	1 µF	1 µF	
Additional text	Mixed circuit				
Group	IIC				
Max. external inductance L_o	300 mH				
Max. external capacitance C_o	3.6 µF				
Additional text	Simple circuit				
Group	IIC				
Max. external inductance L_o	100 mH	50 mH	5 mH	1 mH	10 µH
Max. external capacitance C_o	510 nF	580 nF	600 nF	600 nF	600 nF
Additional text	Mixed circuit				
Max. internal inductance L_i	Negligible				
Max. internal capacitance C_i	11 nF				
Safety-related maximum voltage U_m					
Supply terminals	253 V AC/DC				
Output terminals	250 V AC / 120 V DC				

Approvals and approval marks

ATEX	IBExU 20 ATEX 1107 X ⇨ "Special conditions for use: ", Page 4
Identification marking	⟨Ex⟩ II (1) G [Ex ia Ga] IIC ⟨Ex⟩ II (1) D [Ex ia Da] IIIC ⟨Ex⟩ I (M1) [Ex ia Ma] I ⟨Ex⟩ II 3(1) G Ex ec nC [ia Ga] IIC T4 Gc
IECEx	IECEx IBE 20.0029 X ⇨ "Special conditions for use: ", Page 4
Identification marking	[Ex ia Ga] IIC [Ex ia Da] IIIC [Ex ia Ma] I Ex ec nC [ia Ga] IIC T4 Gc
UL, USA / Canada	Class I Div 2 IS for Class I, II, III Div 1
Safety Integrity Level (SIL)	IEC 61508 (in development)

Special conditions for use:

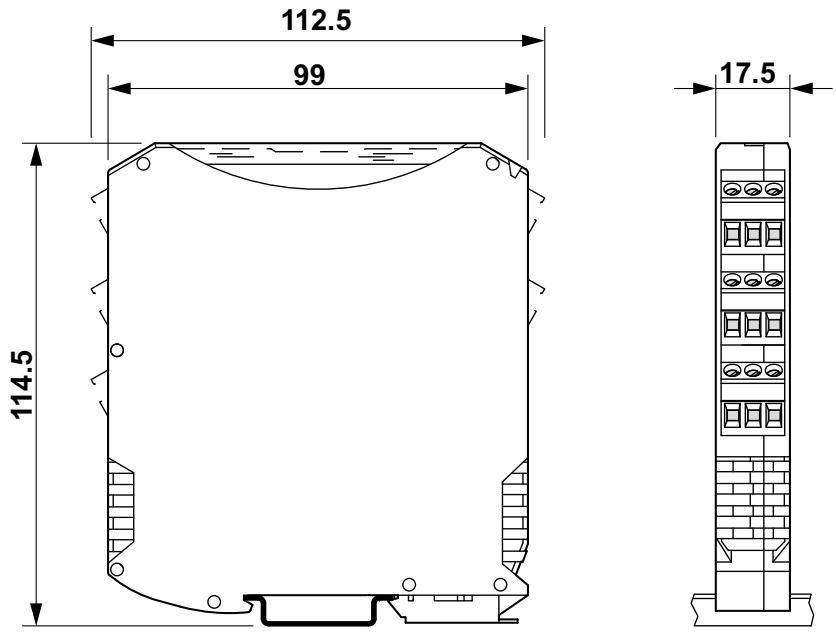
- For installation in category 3, zone 2 potentially explosive areas, the Ex-i isolated switch amplifier must be installed in housing that satisfies the requirements of EN 60079-7 (at least IP54) or another recognized type of protection.
- The connections of non-intrinsically safe circuits must not be connected or disconnected in zone 2 when the power is connected.
- The DIP switches may only be used if no explosive atmosphere is present.

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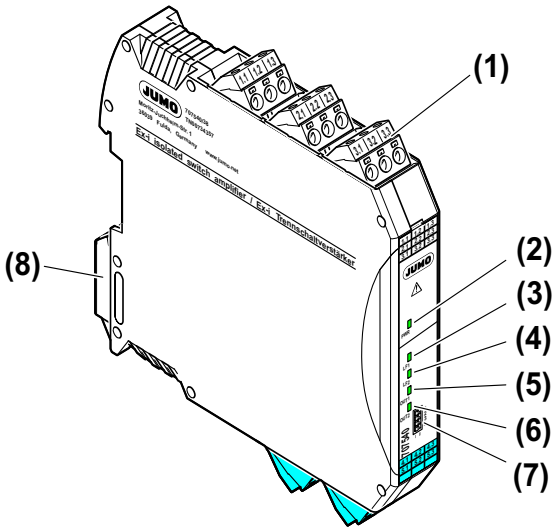
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Dimensions



Display and control elements



1 Pluggable screw connection terminal block
2 Green “PWR” LED, power supply
3 Red "LF1" LED, line fault on sensor line 1
4 Red "LF2" LED, line fault on sensor line 2
5 Yellow "OUT1" LED, status of relay 1
6 Yellow "OUT2" LED, status of relay 2
7 Switch DIP 1 to DIP 4
8 Snap-on foot for DIN rail mounting

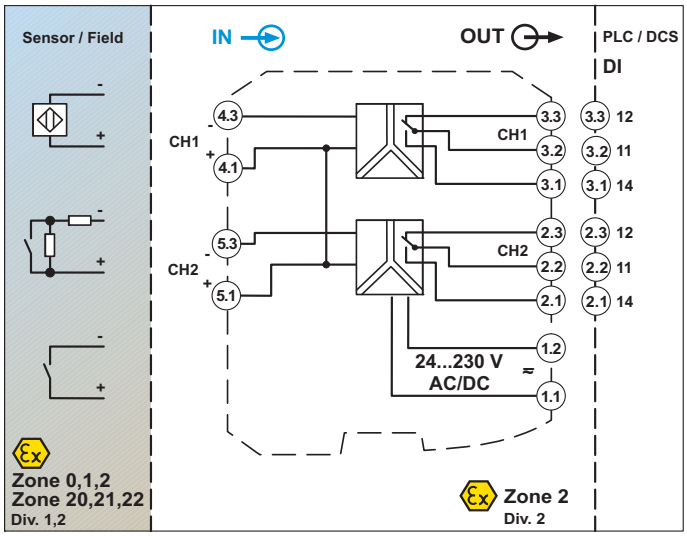
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Connection diagram

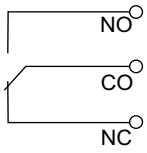
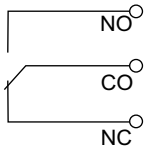
The connection diagram in the data sheet provides preliminary information about the connection options. For the electrical connection, only use the installation instructions or the operating manual. The knowledge and the correct technical compliance with the safety information and warnings contained in these documents are mandatory for mounting, electrical connection, and startup as well as for safety during operation.



Input (Ex-i)

Connection for	Terminals
NAMUR proximity sensors or switch contacts (with resistance circuit)	
Channel 1	4.1 (+) and 4.3 (-)
Channel 2	5.1 (+) and 5.3 (-)

Output

Connection for	Terminals
1 relay (PDT) per channel	
Channel 1 	NO = 3.1 CO = 3.2 NC = 3.3
Channel 2 	NO = 2.1 CO = 2.2 NC = 2.3

NO = Normally Open
CO = Change Over
NC = Normally Closed

Voltage supply

Connection for	Terminals
AC/DC 24 to 230 V	1.1 and 1.2

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Configuration

By default upon delivery, all DIP switches are in the “I” position.

Effective direction (switch DIP 1 = channel 1, DIP 3 = channel 2)

I = Normal phase (operating current behavior)

II = Inverse phase (closed circuit current behavior)

Line fault detection (switch DIP 2 = channel 1, DIP 4 = channel 2)

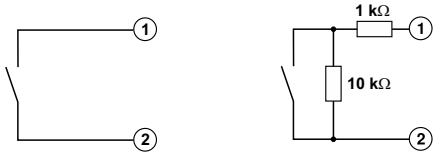
= Line fault detection disabled - not permitted for safety-related applications

II = Line fault detection enabled

If a line fault occurs, the relay trips and the red LED "LF" flashes (NE 44).

NOTE

For switch contacts with an open circuit, line fault detection (LF) must be disabled or the corresponding resistance circuit must be provided directly at the contact.



Operating mode table

Sensor in input		Input circuit	DIP switch				Output		LED	
			Channel 1		Channel 2		Relay contact			
Switch	NAMUR	State	1	2	3	4	N/O contact	N/C contact	OUT	LF
Open	Blocking / open	OK	I	I	I	I	Open	Closed		–
Closed	Conducting / closed	OK	I	I	I	I	Closed	Open	X	–
Open	Blocking / open	OK	II	I	II	I	Closed	Open	X	–
Closed	Conducting / closed	OK	II	I	II	I	Open	Closed		–
	Blocking / open	OK	I	II	I	II	Open	Closed		
	Conducting / closed	OK	I	II	I	II	Closed	Open	X	
	Any	Wire break	I	II	I	II	Open	Closed		X
	Any	Short-circuit	I	II	I	II	Open	Closed		X
	Blocking / open	OK	II	II	II	II	Closed	Open	X	
	Conducting / closed	OK	II	II	II	II	Open	Closed		
	Any	Wire break	II	II	II	II	Open	Closed		X
	Any	Short-circuit	II	II	II	II	Open	Closed		X

NAMUR: proximity sensor in accordance with EN 60947-5-6 or switch contact with resistance circuit

X: LED on or flashing

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Order details

	(1)	Basic type
707540		Ex-i isolating switch amplifier
	(2)	**Power supply**
38		AC/DC 24 to 230 V, -20 to +10 %, 50 to 60 Hz

	(1)		(2)
Order code		/	
Order example	707540	/	38

Scope of delivery

1 device in the ordered version
1 operating manual and 1 EU declaration of conformity

Accessories

		
JUMO NESOS R01 LS float switch in miniature form, Data sheet 408301	JUMO NESOS R02 LS standard version float switch, Data sheet 408302	JUMO NESOS R03 LS float switch with chamber, Data sheet 408303
		
JUMO NESOS R04 LS float switch in curved version, Data sheet 408304	JUMO NESOS R40 LSH horizontal float switch Data sheet 408340	